

INTEGRATED PROCESS FOR THE PREPARATION OF PHENOL FROM BEN-  
ZENE WITH RECYCLING OF THE BY-PRODUCTS

Abstract

- 10 The invention relates to a process for the preparation of  
phenol comprising the following phases:
- 1) preparation in continuous of phenol by means of the di-  
rect oxidation of benzene with hydrogen peroxide operating  
with an  $H_2O_2$ /benzene ratio ranging from 10 to 70%, in a  
15 three-phase reaction system comprising a first liquid phase  
consisting of benzene and an organic solvent, a second liq-  
uid phase consisting of water, a solid phase consisting of  
an activated catalyst based on titanium silicalite TS-1;
  - 2) separation of the phenol and non-reacted benzene from  
20 the reaction mixture of the oxidation section (1), by means  
of fractionated distillation;
  - 3) separation of the solvent and by-products from the mix-  
ture coming from the distillation tail (2), by means of ba-  
sic extraction;
  - 25 4) transformation of the by-products obtain in section (3)  
to phenol by means of hydrodeoxygenation with hydrogen op-  
erating in continuous, in aqueous solution, at a tempera-  
ture ranging from 250 to 500°C, at pressures of 1-100 bar  
and in the presence of a catalyst based on elements of  
30 group VIB or their mixtures or group VIII of the periodic  
table or their mixtures;
  - 5) recycling of the phenol obtained in section (4) to the  
distillation section (2).